



**Minnesota Pollution
Control Agency**

520 Lafayette Road North
St. Paul, MN 55155-4194

**UST Cathodic Protection System Evaluation
Galvanic (Sacrificial Anode) Type
Underground Storage Tanks (UST) Program**

Doc Type: Compliance Certification

Instructions: Within 30 days, send completed form to Joann Henry, Minnesota Pollution Control Agency (MPCA) at the address above, fax to 651-297-2343, or e-mail joann.henry@state.mn.us.

- All reports must be submitted regardless of results (pass, fail, or inconclusive)
- Incomplete, unsigned, or illegible forms will not be accepted and will be returned.

1. UST facility		2. UST owner/operator	
MPCA Site ID #: _____		Name: _____	
Name: <u>MLB Convenience</u>		Address: _____	
Address: <u>40955 Hwy. 169</u>		City: _____ State: <u>Mn</u>	
City: <u>Onamis, Mn</u> Zip code: _____		Zip code: _____ Phone: _____	
County: _____ Phone: _____		Contact phone: _____	
Contact name (if different than above): _____			

3. Cathodic Protection (CP) tester information and qualifications

Tester name (print): Brent Banasiuk Company name: Pump and Meter Service Inc
 Address: 11303 Excelsior Blvd. City: Hopkins
 State: Mn Zip code: 55343 Phone: 952 933 4800 E-mail: bbanasiuk@pump-meter.com
 National Association of Corrosion Engineers (NACE) international certification #: _____ Steel Tank Institute (STI) certification #: CP31712

4. Reason survey was conducted (check only one)

- ☒ Routine - 3 years ☐ Routine - within 6 months of install ☐ 30-day re-survey after fail ☐ Re-survey within 6 months of repair/modification
 Date next CP survey must be conducted by (mm/dd/yyyy): 10/3/2016 (Required within 6 months of install or repair, and every 3 years thereafter.)

5. CP tester's evaluation (check only one)

- ☒ **Pass** All protected structures at this facility pass the CP survey and the continuity survey indicates all protected structures are isolated. It is judged that adequate CP has been provided to the UST system (Complete sections 7 and 8).
☐ **Fail** One or more protected structures at this facility fail the CP survey, and it is judged that adequate CP has not been provided to the UST system. (Complete sections 7 and 8).
☐ **Inconclusive** The remote and the local do not both indicate the same test result on all protected structures (both pass or both fail), or the continuity survey indicates continuous or inconclusive results when compared to non-protected structures, the survey must be evaluated by a corrosion expert (Corrosion Expert to complete section 6).

CP Tester Signature: Brent Banasiuk Date CP survey performed (mm/dd/yyyy): 10/3/2013

6. Corrosion expert's evaluation (if applicable)

The attached survey must be conducted and/or evaluated by a corrosion expert when: a) conducting repairs to metallic structures which are non-factory coated with dielectric material; b) adding supplemental anodes to the tanks and/or piping without following accepted industry standards; c) the local and remote structure-to-soil potential did not result in the same outcome (both pass or both fail); d) the continuity survey indicates one or more of the protected structures are not isolated; e) when required by MPCA (Corrosion Expert to complete sections 7 and 8).

- ☐ **Pass** All protected structures at this facility have been judged that the adequate CP is provided to the UST system
☐ **Fail** One or more protected structures at this facility fail the CP survey and it is judged that adequate CP has not been provided to the UST system.

Corrosion expert's name (print): _____ Phone: _____
 Company name: _____
 NACE Int./PE certification: _____ NACE Int./PE certification #: _____
 CP Expert Signature: _____ Date (mm/dd/yyyy): _____

7. Criteria applicable to evaluation (check all that apply)

- ☒ **-850 On** Structure-to-soil potential more negative than -850 millivolts (mV) with the protective current applied.
☐ **-850 Off** Structure-to-soil potential more negative than -850 mV with the protective current momentarily interrupted. ("Instant Off")
☐ **100 mV** Structure tested exhibits at least 100 mV of cathodic polarization. ("Instant Off" readings minus native /depol readings)

Facility name: _____

Date of test: 10/3/2013

(Note: The facility name and date of test will automatically populate from page one upon printing, if filled out electronically)

8. Action required as a result of this evaluation (check only one)

- ☒ **None** CP is adequate. No further action is necessary at this time. Test again by no later than (see Section 4).
- ☐ **Retest** CP may not be adequate. Retest within 30 days to determine if passing results can be achieved. (Retests may occur only if all protected structures are isolated from non-protected structures)
- ☐ **Repair & Retest** CP is not adequate. Repair/modification is necessary within the next 60 days, or permanently close the tank system.

9. CP system repairs and/or modification information

Date of "failing" test: _____ Date of repair: _____ Repair company: _____
(mm/dd/yyyy) (mm/dd/yyyy)

Name of lead repair technician: _____ Phone # _____

Certification of repair technician (check all that apply): ☐ Steel Tank Institute ☐ NACE ☐ MPCA certified supervisor

Note: submit failing test results with this report if not already submitted.

Description of Repairs (check all that apply)

- | | |
|--|--|
| <input type="checkbox"/> 1. Supplemental anodes for a sti-P ₃ ® tank. | Repairs /modifications for 1 & 2 must be designed by a "corrosion expert" or installed per industry standards. Attach corrosion experts design, or documentation industry standard was followed. (Section 6 must be signed if designed by a corrosion expert.) |
| <input type="checkbox"/> 2. Supplemental anodes for metallic pipe which is factory coated with dielectric material (fusion bonded epoxy or equivalent). | |
| <input type="checkbox"/> 3. Supplemental anodes for a non-sti-P ₃ ® tank. (e.g., bare steel). | Repairs/modifications for 3 & 4 and must be designed and evaluated by a corrosion expert only. Attach a corrosion experts design. (Section 6 must be signed.) |
| <input type="checkbox"/> 4. Supplemental anodes for metallic pipe which is non-factory coated with dielectric material (e.g., galvanized, copper, bare steel, etc.). | |
| <input type="checkbox"/> 5. Isolation of Galvanically protected tanks/piping. (explain in "remarks/other" below). | |
| <input type="checkbox"/> 6. Isolation of non-protected metal pipe segments (e.g., flex connectors) at STP or dispenser sumps (explain in "remarks/other" below). | |

Remarks/Other: _____

10. Galvanic (sacrificial anode) structure to soil potential and continuity survey

Half Cell Placement (testing) on frozen soil, concrete, asphalt, or other paving materials is not acceptable.

Structure to Soil Potentials:

- The half cell must be placed in a minimum of **three locations per tank, and three locations per piping run**. At least one of the reference cell locations must be in the soil directly over the tested structure (local); and at least one must be placed in soil approximately 25 to 100 feet away from the structure (remote). The third location is at the discretion of the tester (either local or remote).
- When testing flex connectors only, **two tests points are required for each flex connector**, one local and one remote.
- Both the local and the remote voltage must meet one of the three criteria listed in section 7 in order for the structure to pass. Inconclusive must be indicated when both the local and the remote structure-to-soil potentials do not result in the same outcome (both pass or both fail).
- If the "-850 mV Off" or the "100 mV Polarization" criteria is used for galvanic systems, record structure-to-soil potential readings on the MPCA Impressed Current data sheet or similar form.

Continuity Testing: (Point-to-Point and/or Fixed Cell-Moving Ground)

- Point-to-Point:** When conducting this method, the leads of the volt meter are required to contact the two structures being examined to demonstrate isolation or continuity. A half cell is not used for this test method.
- Fixed Cell-Moving Ground:** When conducting this method, the half cell must be placed in the soil at a remote location approximately 25 to 100 feet away and left undisturbed. The other lead of the meter is moved to structures being evaluated.
- To interpret continuity data for either method compare the difference in voltage of the structures evaluated and use the following guidelines: 1 mV or less = continuous, 1-10 mV= inconclusive, greater than 10 mV = isolated.
- For galvanic systems, the structure that is to be protected must be isolated from all other non-protected metallic structure in order to "pass" the continuity survey.
- If other approved continuity testing methods are used, alter this form or submit the data on a separate sheet.

Facility name: _____

Date of test: 10/3/2013

(Note: The facility name and date of test will automatically populate from page one upon printing, if filled out electronically.)

Describe soil type and location(s) of remote reference cell placement(s) (e.g., Black Dirt, 30 feet NW of Tank #1 spill bucket):

Remote location #1: 40' to the southeast Grass Area

Remote location #2: _____

Describe soil type(s) of local reference cell placements: Drilled holes @ Tank

Structure to soil potentials (mV)				Continuity testing (mV)			Isolated/ Continuous/ Inconclusive
Half cell site map code	Half cell placement description	"ON" Voltage	Structure tested	Point-to- point voltage	Fixed cell remote voltage		
Structure: (Example) Tank 1	(Ex)1	Local, soil at ATG manway	-1011 mV	(Ex) ATG Conduit	475 mV		isolated
	(Ex)2	Local, Soil at STP manway	-995 mV	(Ex) STP conduit		-528 mV	isolated
	(Ex)R-1	Remote #1	-1042 mV	(Ex) Vent	421 mV		isolated
	Structure contact point(s): (Ex) Tank Bottom			(Ex) Fill Riser	375 mV	-522 mV	isolated
Overall Structure Results (Structure to soil potentials and continuity): <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> Inconclusive							
Structure: 001 Diesel	001 C-1	@ Fill Area	-990	Fill Riser		-473	Isolated
	001 C-2	@ Sub Area	-962	ATG Riser		-438	Isolated
	001 C-3	Remote	-939	ATG Conduit		-508	Isolated
	Structure contact point(s): Tank Bottom						
Overall Structure Results (Structure to soil potentials and continuity): <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> Inconclusive							
Structure: 002 Premium	002 C-1	@ Fill Riser	-1046	Fill Riser		-440	Isolated
	002 C-2	@ Sub Area	-1065	ATG Riser		-407	Isolated
	002 C-3	Remote	-1021	ATG Conduit		-452	Isolated
	Structure contact point(s): Tank Bottom						
Overall Structure Results (Structure to soil potentials and continuity): <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> Inconclusive							
Structure: 003 Midgrade	003 C-1	@ Fill Riser	-1049	Fill Riser		-419	Isolated
	003 C-2	@ Sub Area	-1068	ATG Riser		-441	Isolated
	003 c-3	Remote	-997	ATG Conduit		-397	Isolated
	Structure contact point(s): Tank Bottom						
Overall Structure Results (Structure to soil potentials and continuity): <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> Inconclusive							
Structure: 004 Unlead	004 C-1	@ Fill Riser	-989	Fill Riser		-422	Isolated
	004 C-2	@ Sub Area	-1077	ATG Riser		-418	Isolated
	004 C-3	Remote	-1032	ATG Conduit		-501	Isolated
	Structure contact point(s): Tank Bottom						
Overall Structure Results (Structure to soil potentials and continuity): <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> Inconclusive							
Structure:							
	Structure contact point(s):						
Overall Structure Results (Structure to soil potentials and continuity): <input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> Inconclusive							

Facility name: _____

Date of test: 10/3/2013

(Note: The facility name and date of test will automatically populate from page one upon printing, if filled out electronically.)

Structure to soil potentials (mV)				Continuity testing (mV)		
Half cell site map code	Half cell placement description	"ON" Voltage	Structure tested	Point-to-point voltage	Fixed cell remote voltage	Isolated/Continuous/Inconclusive
Structure: _____						
Structure contact point(s): _____						
Overall Structure Results (Structure to soil potentials and continuity):				<input type="checkbox"/> Pass	<input type="checkbox"/> Fail	<input type="checkbox"/> Inconclusive
Structure: _____						
Structure contact point(s): _____						
Overall Structure Results (Structure to soil potentials and continuity):				<input type="checkbox"/> Pass	<input type="checkbox"/> Fail	<input type="checkbox"/> Inconclusive
Structure: _____						
Structure contact point(s): _____						
Overall Structure Results (Structure to soil potentials and continuity):				<input type="checkbox"/> Pass	<input type="checkbox"/> Fail	<input type="checkbox"/> Inconclusive
Structure: _____						
Structure contact point(s): _____						
Overall Structure Results (Structure to soil potentials and continuity):				<input type="checkbox"/> Pass	<input type="checkbox"/> Fail	<input type="checkbox"/> Inconclusive
Structure: _____						
Structure contact point(s): _____						
Overall Structure Results (Structure to soil potentials and continuity):				<input type="checkbox"/> Pass	<input type="checkbox"/> Fail	<input type="checkbox"/> Inconclusive

Comments/Remarks: _____

If separate corrosion protection is required on flex connectors, treat each flex as if it were an individual metal pipe

Attach additional sheets as needed.

Facility name: _____

Date of test: 10/3/2013

(Note: The facility name and date of test will automatically populate from page one upon printing, if filled out electronically.)

11. Description of UST system

Tank/ Pipe #	Product	Capacity (Gallons)	Tank type ¹	Piping type ²	Metal Segments at Tank sump ³	Metal Segments at Dispenser ³
1	001 Diesel	8000	Steel	Fiberglass	Flex	Flex
2	002 Premium	8000	Steel	Fiberglass	Flex	Flex
3	003 Midgrade	10000	Steel	Fiberglass	Flex	Flex
4	004 Unlead	10000	Steel	Fiberglass	Flex	Flex
5						
6						
Ex:	Premium	10,000	SW sti-P ₃ [®]	DW Fiberglass	CP w/ anodes	In Containment

1. Indicate if tank is Double Wall (DW) or Single Wall (SW). Also indicated type (e.g., steel, fiberglass, sti-P₃[®], composite etc.). Also indicate if tank is compartmental if applicable
2. Indicate if piping is Double Wall (DW) or Single Wall (SW). Also indicate type (e.g., coated steel, fiberglass, galvanized, flex, etc.).
3. Indicate how metal segments such as flex connectors or metal pipe segments are protected from corrosion (e.g., isolated, booted, bonded, CP w/anodes, in containment, etc.)

12. UST facility site drawing

Attach detailed drawing or use the space provided to draw a sketch of the UST and CP systems. At a minimum you should indicate the following: All tanks, piping and dispensers; Location of anodes if known; All buildings and streets; Location of CP test stations; Each reference cell placement (local and remote) must be indicated by a code (e.g., 1,2, T-1,) corresponding with the appropriate test in Section 10 of this form. If supplemental anodes are added to the tank system, indicate number, size, location and depth of the new anodes. An evaluation of the CP system is not complete without an acceptable site drawing.



[Indicate North Here]

Facility name: _____

Date of test: 10/3/2013

(Note: The facility name and date of test will automatically populate from page one upon printing, if filled out electronically.)

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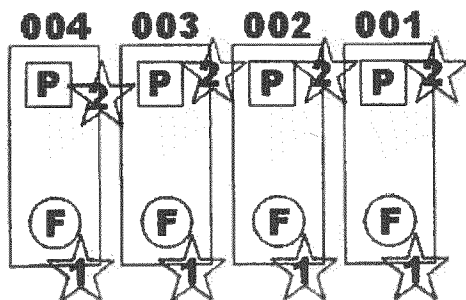
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LEGEND

P	PROBE
F	FILL
☆	1/2 CELL
D	DISPENSER
R	RECTIFIER
J	JUNCTION BOX



→ N

3



Minnesota Pollution
Control Agency

520 Lafayette Road North
St. Paul, MN 55155-4194

Underground Storage Tanks

Cathodic Protection System Evaluation Sacrificial Anode Type

Submit this form to the MPCA within 30 days after conducting an evaluation of a regulated underground storage tank (UST) system with a sacrificial anode (galvanic) type cathodic protection system.

MPCA Use Only	
Site #:	
County:	
Date rec'd:	

Ways to submit:

- Mail: Attn: Joann Henry at above address
- Fax: 651-297-2343 or 651-297-8683, Attn: Joann Henry

Important:

- Form must be completed and signed by a qualified Cathodic Protection Tester.
- Evaluation must be in accordance with NACE RP0285, Corrosion Control of UST Systems by Cathodic Protection.
- At least two test points per tank and per piping run must be utilized.
- A site diagram showing tank and piping locations and reference cell placement must be provided.
- Incomplete and unsigned forms will be returned.

Site Information

Site name: MILL LACS CONVENIENCE (DEWEY ANNIS)
Address: 40955 Hwy 169
City: DNAMIA State: MA Zip code: _____
Phone: _____ County: MILLS LACS Site # (if known): _____

Owner Information

Site name: _____ Phone: _____
Address: _____
City: _____ State: _____ Zip code: _____

Cathodic Protection Expert Information

Site name: O'DAY EQUIPMENT LLC
Address: 4981 LIGHTNING DRIVE
City: DULUTH State: MA Zip code: 55811
Phone: 218-729-0757 STI certification #: CP 20210 NACE certification #: _____

Reason for Evaluation

- ☒ Routine annual evaluation
☐ Re-evaluation within six months of installation
☐ Re-evaluation with six months of a repair/modification

Result of Evaluation

- ☒ Pass All protected structures at this facility pass the cathodic protection evaluation. Cathodic protection is adequate (-.850 mv or greater) to protect the UST system.
- ☐ Fail One or more protected structures at this facility fail the cathodic protection evaluation. Cathodic protection is inadequate (-.850 mv or less) to protect the UST system. See results on back.

Action Required

- ☒ None Cathodic protection is adequate. No further action is necessary at this time.
- ☐ Repair & Retest Cathodic protection is not adequate. Repair/modification is necessary as soon as possible, not to exceed 60 days. Re-evaluation required within 6 months of repair/modification.

Test again no later than (mm/dd/yyyy): _____

Test Results

Test Point	Structure Description	*Potential Volts (V)	Structure Status
(example)	Tank - Diesel	988	Pass
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			

Structure Isolation	Voltage	Isolated
Tank to tank		
NL - PREM	19.0 mV	
NL - mid	28.4 mV	
PREM - mid	48.4 mV	
Tank to conduit		
DIESEL	512 mV	
Tank to pipe		
DIESEL		
	NON METALIC	
Pipe to pipe		
DIESEL		
	NON METALIC	
Pipe to conduit		
DIESEL		
	NON METALIC	

Half-cell Placement (Describe soil type, e.g. clay, gravel, black dirt):

Site Diagram (Show location of all tanks, piping, and dispensers. Show each half-cell placement. Number each test point.
May attach site diagram on a separate sheet.)

Signature of Cathodic
Protection Tester:

[Handwritten Signature]

Date of evaluation:
(mm/dd/yyyy)

11-11-10

t-u5-05
3/25/08

Page 2 of 2

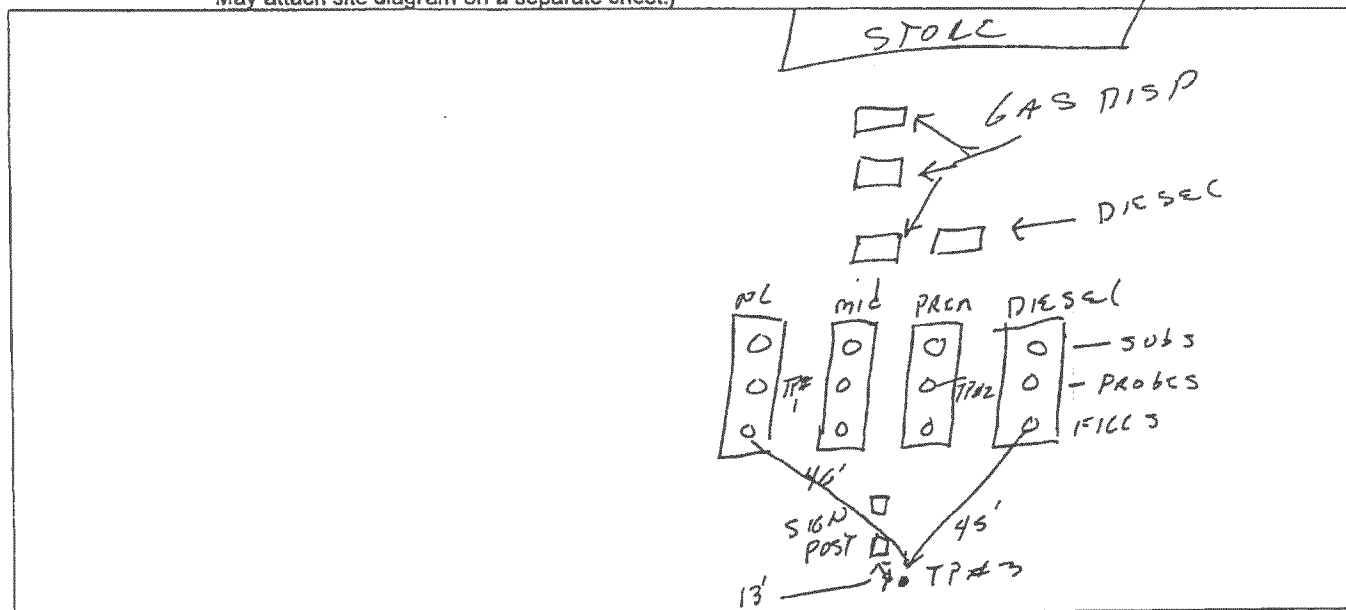
Test Results

Test Point	Structure Description	*Potential Volts (V)	Structure Status
(example)	Tank Diesel	989	Pass
1	NL	-1115 mV	
2	NL	-1102 mV	
3	NL	-967 mV	
4	mid	-1132 mV	
5	mid	-1131 mV	
6	mid	-996 mV	
7	PREM	-1130 mV	
8	PREM	-1121 mV	
9	PREM	-987 mV	
10	DIESEL	-1066 mV	
11	DIESEL	-1057 mV	
12	DIESEL	-992 mV	
13			
14	NON METALIC		
15	PIPING		
16			
17			
18			
19			

Structure Isolation	Voltage	Isolated
Tank to tank		
D-P	64.0 mV	
D-mid	73.5 mV	
D-NL	45.1 mV	
Tank to conduit		
NL	490 mV	
mid	448 mV	
PREM	429 mV	
Tank to pipe		
NL		
mid	NON METALIC	
PREM	4.0 mV	
Pipe to pipe		
NL		
mid	NON METALIC	
PREM		
Pipe to conduit		
NL		
mid	NON METALIC	
PREM		

Half-cell Placement (Describe soil type, e.g. clay, gravel, black dirt):

Site Diagram (Show location of all tanks, piping, and dispensers. Show each half-cell placement. Number each test point. May attach site diagram on a separate sheet.)

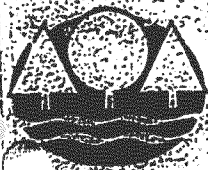


Signature of Cathodic Protection Tester:

[Handwritten Signature]

Date of evaluation:
(mm/dd/yyyy)

11-11-10



Minnesota Pollution Control Agency Galvanic (Sacrificial Anode) Cathodic Protection System Evaluation

W/O
36439

- This form must be utilized to evaluate underground storage tank (UST) cathodic protection systems in the State of Minnesota.
- At least two test points per tank and piping run must be utilized.
- A site drawing showing reference cell placement and tank and piping locations must be provided.

A copy of this form must be sent to: MPCA/Joann Henry, 520 Lafayette Blvd. N, St. Paul, MN 55155

UST Owner		UST Facility	
Name:		Name:	MLB CONCRETE
Address:		Address:	
City:	State	City:	ONAMIA State MN
Telephone:		Telephone:	

CP Tester		CP Tester's Qualifications	
Tester's Name:	DEWEY ANNIS	STI Certification Number:	CP 820-04
Company Name:	O'DAY EQUIPMENT	NACE Certification Number:	
Address:	4991 LIGHTNING DRIVE	Other (explain):	
City:	DULUTH State MN		
Telephone:	218-729-0757		

Reason Survey was Conducted	
<input checked="" type="checkbox"/> Routine-3 year	<input type="checkbox"/> Routine-within 6 months of installation
<input type="checkbox"/> Re-Survey after repair/modification	
Date next cathodic protection survey must be conducted by / / (required within 6 mo. of install & every 3 years thereafter)	

Cathodic Protection Tester's Evaluation	
Check all that apply to this evaluation:	
<input type="checkbox"/> 850 ON	Structure to soil potential more negative than -850 mV with respect to CuCuSO ₄ reference cell and protective current applied (applies to any galvanically protected structure)
<input type="checkbox"/> 850 OFF	Structure to soil potential more negative than -850 mV with protective current interrupted (instant off)
<input type="checkbox"/> 100 mV Polarization	Structure tested exhibits at least 100 mV cathodic polarization (applicable for systems where anodes can be temporarily disconnected)
<input checked="" type="checkbox"/> PASS	All protected structures at this facility pass the cathodic protection survey and cathodic protection is adequate to protect the UST system(s).
<input type="checkbox"/> FAIL	One or more protected structures at this facility fail the cathodic protection survey and cathodic protection is inadequate to protect the UST system(s). See results on back
CP Tester's Signature: <i>Dewey Annis</i>	Date CP Survey Performed: 6/19/09

Action Required as a Result of this Evaluation	
<input checked="" type="checkbox"/> NONE	Cathodic protection is adequate. No further action is necessary at this time. Test again by no later than / /
<input type="checkbox"/> RETEST	Cathodic protection may not be adequate. Retest during the next 60 days to determine if passing results can be achieved.
<input type="checkbox"/> REPAIR & RETEST	Cathodic protection is not adequate. Repair/modification is necessary as soon as possible but within 60 days.

Tank Cathodic Protection Survey Information and Results

Tank Number	Product	Capacity	Structure Test Location #1	Fixed Remote Voltage	Structure Test Location #2	Fixed Remote Voltage	Isolated/Continuous/Inconclusive
				On / Off		On / Off	
#1	UNL		-1.148	NA	-1.150	NA	ISO
#2	MILGRADE		-1.164	NA	-1.164	NA	ISO
#3	PREM		-1.165	NA	-1.169	NA	ISO
#4	DIESEL		-1.155	NA	-1.158	NA	ISO

Piping Cathodic Protection Survey Information and Results

Tank Number	Product	Piping Type	Structure Test Location #1	Fixed Remote Voltage mV	Structure Test Location #2	Fixed Remote Voltage mV	Isolated/Continuous/Inconclusive
				On / Off		On / Off	
#1	UNL	STEEL	-1.107	NA	-1.110	NA	ISO
#2	MIL	" "	-1.108	NA	-1.110	NA	ISO
#3	PREM	" "	-1.124	NA	-1.120	NA	ISO
#4	DIESEL	" "	-1.055	NA	-1.060	NA	ISO

Site Diagram (show all tank, piping and dispenser locations and locations of test readings and reference cell placements using specific numbering/test, ie. Tank 001/Test 1 or 001/T-1):

